

WHAT IS CLAIMED IS:

1. A vehicle driving force control apparatus for a vehicle having a wheel, a drive source configured to supply the wheel with a drive torque, and a clutch disposed in a torque transfer path from the drive source to the wheel, the vehicle driving force control apparatus comprising:
  - a transition determining section configured to output a transition determination upon determining a transition condition indicating cease of the drive torque from the drive source to the wheel, while the vehicle is traveling; and
  - a clutch release section configured to disengage the clutch, upon the drive torque of the drive source substantially reaching a target drive torque in which a difference between an output torque of the clutch and an input torque of the clutch is smaller than a prescribed value in response to the transition determination by the transition determining section.
2. The vehicle driving force control apparatus as recited in claim 1, wherein the prescribed value is substantially equals zero.
3. The vehicle driving force control apparatus as recited in claim 1, further comprising
  - a drive torque control section configured to adjust the target drive torque in response to the transition determination by the transition determining section.
4. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to substantially maintain the drive torque of the drive source substantially at the target drive torque at least during a delay period after issuance of a control command to release the clutch and until the clutch is released.

5. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to substantially maintain the drive torque of the drive source substantially at the target drive torque at issuance of a control command to release the clutch and until the clutch is released.

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6. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to substantially maintain the drive torque of the drive source substantially at the target drive torque prior to start of a release operation of the clutch and until the clutch is released.

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7. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section starts the clutch disengagement operation, upon the drive torque of the drive source substantially reaching the target drive torque.

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8. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to reduce the drive torque of the drive source within a reduction range that the drive torque of the drive source can be stably controlled when the drive torque of the drive source is larger than the target drive torque after the transition determination by the transition determining section to cease the drive torque of the drive source to the wheel until the clutch is released.

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9. The vehicle driving force control apparatus as recited in claim 8, wherein the drive torque control section is further configured to reduce the drive torque of the drive source within the reduction range at a predetermined reduction rate.

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10. The vehicle driving force control apparatus as recited in claim 8, wherein the drive torque control section is further configured to reduce the drive torque of the drive source until the clutch is released by controlling a field current of an electric motor of the drive source of the vehicle to a predetermined field current value.

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11. The vehicle driving force control apparatus as recited in claim 10, wherein  
the drive torque control section is further configured to setting an armature current  
command value of an armature current of the drive source to substantially equal a  
predetermined end-time armature current value that the drive source requires to output the  
5 target drive torque when the field current of the drive source is substantially equal to the  
predetermined field current value.

12. The vehicle driving force control apparatus as recited in claim 9, wherein  
the clutch release section is further configured to set the target drive torque on a  
10 generation capacity of a generator that supplies electricity to an electric motor of the drive  
source.

13. The vehicle driving force control apparatus as recited in claim 9, wherein  
the drive torque control section is further configured to set the target drive torque  
15 based on a generation capacity of a generator that supplies electricity to an electric motor  
of the drive source prior to the transition determination by the transition determining  
section.

14. The vehicle driving force control apparatus as recited in claim 3, further  
20 comprising  
an output torque control section configured to control a driving torque of a  
secondary driving source to a target drive torque command value;  
a generation capacity reduction detection section configured to detect whether an  
electrical capacity of a power source to supply power to the drive source decreases to an  
25 insufficient power state in which the power source cannot supply sufficient power to  
output the driving torque of the secondary driving source to a level substantially equal to  
the target drive torque command value; and  
an output torque command limiting section configured to limit the target drive  
torque command value, when the transition determining section determines the transition  
30 condition indicating cease the drive torque of the drive source to the wheel, based on  
detecting that the drive torque of the drive source is decreasing, and when the generation

capacity reduction detection section detects that the electrical capacity decreases to the insufficient power state, while the vehicle is traveling.

15. The vehicle driving force control apparatus as recited in claim 14, wherein  
5 the output torque control section is further configured to reduce the target drive torque command value at a prescribed reduction rate, when the transition determining section detects that the drive torque of the drive source is decreasing, and when the generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state, while the vehicle is traveling; and  
10 the output torque command limiting section is further configured to control the target drive torque command value by increasing the prescribed reduction rate, when the generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state.

- 15 16. A vehicle driving force control apparatus as recited in claim 14, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, based on detecting an upshift in an automatic transmission of the vehicle provided between the drive source and the drive wheel.

- 20 17. The vehicle driving force control apparatus as recited in claim 14, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of a generator of the power source is detected to be below a prescribed rotational speed.

- 25 18. The vehicle driving force control apparatus as recited in claim 14, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of the drive source is detected to be below a prescribed rotational speed.

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19. The vehicle driving force control apparatus as recited in claim 8, wherein  
the drive torque control section is further configured to control the drive torque of  
the drive source within the reduction range at a first predetermined reduction rate during a  
first control period and at a second predetermined reduction rate during a second control  
5 period before the clutch is released.

20. The vehicle driving force control apparatus as recited in claim 19, wherein  
the drive torque control section is further configured to control the drive torque of  
the drive source during the first and second periods after issuance of a control command to  
10 release the clutch.

21. The vehicle driving force control apparatus as recited in claim 19, wherein  
the drive torque control section is further configured to control the drive torque of  
the drive source such that the second predetermined reduction rate during the second  
15 period maintains the drive torque substantially constant before the clutch is released.

22. The vehicle driving force control apparatus as recited in claim 21, wherein  
the drive torque control section is further configured to reduce the drive torque of  
the drive source to the clutch such that the drive torque of the drive source is controlled to  
20 substantially equal the target drive torque by controlling a field current command value of  
the field current of the drive source to the predetermined field current value.

23. The vehicle driving force control apparatus as recited in claim 22, wherein  
the drive torque control section is further configured to setting an armature current  
25 command value of an armature current of the drive source to substantially equal a  
predetermined end-time armature current value that the drive source requires to output the  
target drive torque when the field current of the drive source is substantially equal to the  
predetermined field current value.

24. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to control the drive torque of the drive source until the clutch is released by controlling a field current of a power source of the drive source of the vehicle to a predetermined value.

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25. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to reduce the drive torque of the drive source to the clutch such that the drive torque of the drive source is an output motor torque of a power source which is controlled to substantially equal the target drive torque by controlling a field current command value of the field current of power source to a predetermined field current value.

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26. The vehicle driving force control apparatus as recited in claim 3, wherein the drive torque control section is further configured to control the drive torque of the drive source until the clutch is released by setting an armature current command value of an armature current of an electric motor substantially equal to an end-time armature current value immediately after the transition determining section outputs the transition determination.

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27. The vehicle driving force control apparatus as recited in claim 3, wherein the clutch release section is further configured to estimate a convergence time for fluctuations in the drive torque of the drive source to converge within a prescribed allowable range, and output a command value for releasing the clutch such that the clutch is released after the convergence time has elapsed based on the estimate.

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28. The vehicle driving force control apparatus as recited in claim 1, further comprising

a clutch-release torque correction section configured to correct the target drive torque in accordance with a vehicle body acceleration of the vehicle.

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29. The vehicle driving force control apparatus as recited in claim 1, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on determining that the drive torque of the drive source is decreasing, while the vehicle is traveling.

30. The vehicle driving force control apparatus as recited in claim 1, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting a field current value of the drive source that corresponds to the drive torque at which an armature current value of the drive torque become equal to a predetermined end-time armature current value, while the vehicle is traveling.

31. The vehicle driving force control apparatus as recited in claim 1, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting a prescribed motor torque of the drive source that corresponds to the drive torque at which an armature current value to become equal to a predetermined end-time armature current value, while the vehicle is traveling.

32. The vehicle driving force control apparatus as recited in claim 1, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting an armature current value of the drive source that corresponds to a predetermined end-time armature current value, while the vehicle is traveling.

33. The vehicle driving force control apparatus as recited in claim 1, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting that the drive torque of the drive source has substantially reached the target drive torque, while the vehicle is traveling.

34. The vehicle driving force control apparatus as recited in claim 1, further comprising  
an electric motor that forms part of the drive source.
- 5 35. The vehicle driving force control apparatus as recited in claim 34, wherein the prescribed value is substantially equals zero.
36. The vehicle driving force control apparatus as recited in claim 34, further comprising  
10 a drive torque control section configured to adjust the target drive torque in response to the transition determination by the transition determining section.
37. The vehicle driving force control apparatus as recited in claim 36, wherein the drive torque control section is further configured to substantially maintain the  
15 drive torque of the electric motor substantially at the target drive torque at least during a delay period after issuance of a control command to release the clutch and until the clutch is released.
38. The vehicle driving force control apparatus as recited in claim 36, wherein  
20 the drive torque control section is further configured to substantially maintain the drive torque of the electric motor substantially at the target drive torque at issuance of a control command to release the clutch and until the clutch is released.
39. The vehicle driving force control apparatus as recited in claim 36, wherein  
25 the drive torque control section is further configured to substantially maintain the drive torque of the electric motor substantially at the target drive torque prior to start of a release operation of the clutch and until the clutch is released.
40. The vehicle driving force control apparatus as recited in claim 36, wherein  
30 the drive torque control section starts the clutch disengagement operation, upon the drive torque of the electric motor substantially reaching the target drive torque.



41. The vehicle driving force control apparatus as recited in claim 36, wherein  
the drive torque control section is further configured to reduce the drive torque of  
the electric motor within a reduction range that the drive torque of the electric motor can  
be stably controlled when the drive torque of the electric motor is larger than the target  
5 drive torque after the transition determination by the transition determining section to  
cease the drive torque of the electric motor to the wheel until the clutch is released.

42. The vehicle driving force control apparatus as recited in claim 41, wherein  
the drive torque control section is further configured to reduce the drive torque of  
10 the electric motor within the reduction range at a predetermined reduction rate.

43. The vehicle driving force control apparatus as recited in claim 41, wherein  
the drive torque control section is further configured to reduce the drive torque of  
the electric motor until the clutch is released by controlling a field current of the electric  
15 motor of the vehicle to a predetermined field current value.

44. The vehicle driving force control apparatus as recited in claim 43, wherein  
the drive torque control section is further configured to setting an armature current  
command value of an armature current of the electric motor to substantially equal a  
20 predetermined end-time armature current value that the electric motor requires to output  
the target drive torque when the field current of the electric motor is substantially equal to  
the predetermined field current value.

45. The vehicle driving force control apparatus as recited in claim 42, wherein  
25 the clutch release section is further configured to set the target drive torque on a  
generation capacity of a generator that supplies electricity to the electric motor.

46. The vehicle driving force control apparatus as recited in claim 42, wherein  
the drive torque control section is further configured to set the target drive torque  
30 based on a generation capacity of a generator that supplies electricity to the electric motor  
prior to the transition determination by the transition determining section.

47. The vehicle driving force control apparatus as recited in claim 36, further comprising

an output torque control section configured to control a driving torque of a secondary driving source to a target drive torque command value;

5 a generation capacity reduction detection section configured to detect whether a electrical capacity of a power source to supply power to the electric motor decreases to an insufficient power state in which the power source cannot supply sufficient power to output the driving torque of the secondary driving source to a level substantially equal to the target drive torque command value; and

10 an output torque command limiting section configured to limit the target drive torque command value, when the transition determining section determines the transition condition indicating cease the drive torque of the electric motor to the wheel, based on detecting that the drive torque of the electric motor is decreasing, and when the generation capacity reduction detection section detects that the electrical capacity decreases to the  
15 insufficient power state, while the vehicle is traveling.

48. The vehicle driving force control apparatus as recited in claim 47, wherein the output torque control section is further configured to reduce the target drive torque command value at a prescribed reduction rate, when the transition determining  
20 section detects that the drive torque of the electric motor is decreasing, and when the generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state, while the vehicle is traveling; and

the output torque command limiting section is further configured to control the target drive torque command value by increasing the prescribed reduction rate, when the  
25 generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state.

49. A vehicle driving force control apparatus as recited in claim 47, wherein the generation capacity reduction detection section is further configured to  
30 determine that the generation capacity decreases, based on detecting an upshift in an automatic transmission of the vehicle provided between the electric motor and the drive wheel.

50. The vehicle driving force control apparatus as recited in claim 47, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of a generator of the power source is detected to be below a prescribed rotational speed.

51. The vehicle driving force control apparatus as recited in claim 47, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of the electric motor is detected to be below a prescribed rotational speed.

52. The vehicle driving force control apparatus as recited in claim 41, wherein the drive torque control section is further configured to control the drive torque of the electric motor within the reduction range at a first predetermined reduction rate during a first control period and at a second predetermined reduction rate during a second control period before the clutch is released.

53. The vehicle driving force control apparatus as recited in claim 52, wherein the drive torque control section is further configured to control the drive torque of the electric motor during the first and second periods after issuance of a control command to release the clutch.

54. The vehicle driving force control apparatus as recited in claim 52, wherein the drive torque control section is further configured to control the drive torque of the electric motor such that the second predetermined reduction rate during the second period maintains the drive torque substantially constant before the clutch is released.

55. The vehicle driving force control apparatus as recited in claim 54, wherein the drive torque control section is further configured to reduce the drive torque of the electric motor to the clutch such that the drive torque of the electric motor is controlled to substantially equal the target drive torque by controlling a field current command value of the field current of the electric motor to the predetermined field current value.

56. The vehicle driving force control apparatus as recited in claim 55, wherein the drive torque control section is further configured to setting an armature current command value of an armature current of the electric motor to substantially equal a predetermined end-time armature current value that the electric motor requires to output the target drive torque when the field current of the electric motor is substantially equal to the predetermined field current value.

57. The vehicle driving force control apparatus as recited in claim 36, wherein the drive torque control section is further configured to control the drive torque of the electric motor until the clutch is released by controlling a field current of a power source of the electric motor of the vehicle to a predetermined value.

58. The vehicle driving force control apparatus as recited in claim 36, wherein the drive torque control section is further configured to reduce the drive torque of the electric motor to the clutch such that the drive torque of the electric motor is an output motor torque of a power source which is controlled to substantially equal the target drive torque by controlling a field current command value of the field current of power source to a predetermined field current value.

59. The vehicle driving force control apparatus as recited in claim 36, wherein the drive torque control section is further configured to control the drive torque of the electric motor until the clutch is released by setting an armature current command value of an armature current of an electric motor substantially equal to an end-time armature current value immediately after the transition determining section outputs the transition determination.

60. The vehicle driving force control apparatus as recited in claim 36, wherein the clutch release section is further configured to estimate a convergence time for fluctuations in the drive torque of the electric motor to converge within a prescribed allowable range, and output a command value of the clutch release such that the clutch is released after the convergence time has elapsed based on the estimate.

61. The vehicle driving force control apparatus as recited in claim 34, further comprising

5 a clutch-release torque correction section configured to correct the target drive torque in accordance with a vehicle body acceleration of the vehicle.

62. The vehicle driving force control apparatus as recited in claim 34, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the electric motor to the wheel based on  
10 determining that the drive torque of the electric motor is decreasing, while the vehicle is traveling.

63. The vehicle driving force control apparatus as recited in claim 34, wherein the transition determining section is further configured to determine the transition  
15 condition indicating cease the drive torque of the electric motor to the wheel based on detecting a field current value of the electric motor that corresponds to the drive torque at which an armature current value of the drive torque become equal to a predetermined end-time armature current value, while the vehicle is traveling.

20 64. The vehicle driving force control apparatus as recited in claim 34, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the electric motor to the wheel based on detecting a prescribed motor torque of the electric motor that corresponds to the drive torque at which an armature current value to become equal to a predetermined end-time  
25 armature current value, while the vehicle is traveling.

65. The vehicle driving force control apparatus as recited in claim 34, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the electric motor to the wheel based on  
30 detecting an armature current value of the electric motor that corresponds to a predetermined end-time armature current value, while the vehicle is traveling.

66. The vehicle driving force control apparatus as recited in claim 34, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the electric motor to the wheel based on detecting that the drive torque of the electric motor has substantially reached the target drive torque, while the vehicle is traveling.

67. The vehicle driving force control apparatus as recited in claim 1, further comprising a drive mode selection section configured to select between a multi-wheel drive mode and a non-all wheel drive mode, the multi-wheel drive mode driving at least the wheel by the drive source through engagement of the clutch and an additional wheel independently of engagement of the clutch, and the non-all wheel drive mode disengaging the wheel from the drive source through disengagement of the clutch and driving the additional wheel.

68. The vehicle driving force control apparatus as recited in claim 67, further comprising an acceleration slippage detection section configured to detect if acceleration slippage is occurring in the wheel that is driven by the drive source; and the drive mode selection section being configured to select between the multi-wheel drive mode and the non-all wheel drive mode based on detection of acceleration slippage by the acceleration slippage detection section.

69. The vehicle driving force control apparatus as recited in claim 67, wherein the drive mode selection section includes a drive mode switch to manually select one of the multi-wheel drive mode and the non-all wheel drive mode.

70. The vehicle driving force control apparatus according to claim 67, wherein an electric motor forms part of the drive source.

71. The vehicle driving force control apparatus according to claim 70, wherein the electric motor is driven by a generator being driven by an internal combustion engine.
- 5 72. The vehicle driving force control apparatus as recited in claim 67, wherein the prescribed value is substantially equals zero.
73. The vehicle driving force control apparatus as recited in claim 67, further comprising
- 10 a drive torque control section configured to adjust the target drive torque in response to the transition determination by the transition determining section.
74. The vehicle driving force control apparatus as recited in claim 73, wherein the drive torque control section is further configured to substantially maintain the
- 15 drive torque of the drive source substantially at the target drive torque at least during a delay period after issuance of a control command to release the clutch and until the clutch is released.
75. The vehicle driving force control apparatus as recited in claim 73, wherein
- 20 the drive torque control section is further configured to substantially maintain the drive torque of the drive source substantially at the target drive torque at issuance of a control command to release the clutch and until the clutch is released.
76. The vehicle driving force control apparatus as recited in claim 73, wherein
- 25 the drive torque control section is further configured to substantially maintain the drive torque of the drive source substantially at the target drive torque prior to start of a release operation of the clutch and until the clutch is released.
77. The vehicle driving force control apparatus as recited in claim 73, wherein
- 30 the drive torque control section starts the clutch disengagement operation, upon the drive torque of the drive source substantially reaching the target drive torque.

78. The vehicle driving force control apparatus as recited in claim 73, wherein the drive torque control section is further configured to reduce the drive torque of the drive source within a reduction range that the drive torque of the drive source can be stably controlled when the drive torque of the drive source is larger than the target drive torque after the transition determination by the transition determining section to cease the drive torque of the drive source to the wheel until the clutch is released.

79. The vehicle driving force control apparatus as recited in claim 78, wherein the drive torque control section is further configured to reduce the drive torque of the drive source within the reduction range at a predetermined reduction rate.

80. The vehicle driving force control apparatus as recited in claim 78, wherein the drive torque control section is further configured to reduce the drive torque of the drive source until the clutch is released by controlling a field current of an electric motor of the drive source of the vehicle to a predetermined field current value.

81. The vehicle driving force control apparatus as recited in claim 80, wherein the drive torque control section is further configured to setting an armature current command value of an armature current of the drive source to substantially equal a predetermined end-time armature current value that the drive source requires to output the target drive torque when the field current of the drive source is substantially equal to the predetermined field current value.

82. The vehicle driving force control apparatus as recited in claim 79, wherein the clutch release section is further configured to set the target drive torque on a generation capacity of a generator that supplies electricity to an electric motor of the drive source.

83. The vehicle driving force control apparatus as recited in claim 79, wherein the drive torque control section is further configured to set the target drive torque based on a generation capacity of a generator that supplies electricity to an electric motor



of the drive source prior to the transition determination by the transition determining section.

84. The vehicle driving force control apparatus as recited in claim 83, further comprising

an output torque control section configured to control a driving torque of a secondary driving source to a target drive torque command value;

a generation capacity reduction detection section configured to detect whether a electrical capacity of a power source to supply power to the drive source decreases to an insufficient power state in which the power source cannot supply sufficient power to output the driving torque of the secondary driving source to a level substantially equal to the target drive torque command value; and

an output torque command limiting section configured to limit the target drive torque command value, when the transition determining section determines the transition condition indicating cease the drive torque of the drive source to the wheel, based on detecting that the drive torque of the drive source is decreasing, and when the generation capacity reduction detection section detects that the electrical capacity decreases to the insufficient power state, while the vehicle is traveling.

85. The vehicle driving force control apparatus as recited in claim 84, wherein the output torque control section is further configured to reduce the target drive torque command value at a prescribed reduction rate, when the transition determining section detects that the drive torque of the drive source is decreasing, and when the generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state, while the vehicle is traveling; and

the output torque command limiting section is further configured to control the target drive torque command value by increasing the prescribed reduction rate, when the generation capacity reduction detection section detects that the generation capacity decreases to the insufficient power state.

86. A vehicle driving force control apparatus as recited in claim 84, wherein

the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, based on detecting an upshift in an automatic transmission of the vehicle provided between the drive source and the drive wheel.

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87. The vehicle driving force control apparatus as recited in claim 84, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of a generator of the power source is detected to be below a prescribed rotational speed.

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88. The vehicle driving force control apparatus as recited in claim 84, wherein the generation capacity reduction detection section is further configured to determine that the generation capacity decreases, when a rotational speed of the drive source is detected to be below a prescribed rotational speed.

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89. The vehicle driving force control apparatus as recited in claim 88, wherein the drive torque control section is further configured to control the drive torque of the drive source within the reduction range at a first predetermined reduction rate during a first control period and at a second predetermined reduction rate during a second control period before the clutch is released.

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90. The vehicle driving force control apparatus as recited in claim 89, wherein the drive torque control section is further configured to control the drive torque of the drive source during the first and second periods after issuance of a control command to release the clutch.

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91. The vehicle driving force control apparatus as recited in claim 89, wherein the drive torque control section is further configured to control the drive torque of the drive source such that the second predetermined reduction rate during the second period maintains the drive torque substantially constant before the clutch is released.

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92. The vehicle driving force control apparatus as recited in claim 91, wherein

the drive torque control section is further configured to reduce the drive torque of the drive source to the clutch such that the drive torque of the drive source is controlled to substantially equal the target drive torque by controlling a field current command value of the field current of the drive source to the predetermined field current value.

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93. The vehicle driving force control apparatus as recited in claim 92, wherein the drive torque control section is further configured to setting an armature current command value of an armature current of the drive source to substantially equal a predetermined end-time armature current value that the drive source requires to output the target drive torque when the field current of the drive source is substantially equal to the predetermined field current value.

94. The vehicle driving force control apparatus as recited in claim 73, wherein the drive torque control section is further configured to control the drive torque of the drive source until the clutch is released by controlling a field current of a power source of the drive source of the vehicle to a predetermined value.

95. The vehicle driving force control apparatus as recited in claim 73, wherein the drive torque control section is further configured to reduce the drive torque of the drive source to the clutch such that the drive torque of the drive source is an output motor torque of a power source which is controlled to substantially equal the target drive torque by controlling a field current command value of the field current of power source to a predetermined field current value.

96. The vehicle driving force control apparatus as recited in claim 73, wherein the drive torque control section is further configured to control the drive torque of the drive source until the clutch is released by setting an armature current command value of an armature current of an electric motor substantially equal to an end-time armature current value immediately after the transition determining section outputs the transition determination.

97. The vehicle driving force control apparatus as recited in claim 73, wherein

the clutch release section is further configured to estimate a convergence time for fluctuations in the drive torque of the drive source to converge within a prescribed allowable range, and output a command value of the clutch release such that the clutch is released after the convergence time has elapsed based on the estimate.

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98. The vehicle driving force control apparatus as recited in claim 67, further comprising

a clutch-release torque correction section configured to correct the target drive torque in accordance with a vehicle body acceleration of the vehicle.

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99. The vehicle driving force control apparatus as recited in claim 67, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on determining that the drive torque of the drive source is decreasing, while the vehicle is traveling.

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100. The vehicle driving force control apparatus as recited in claim 67, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting a field current value of the drive source that corresponds to the drive torque at which an armature current value of the drive torque become equal to a predetermined end-time armature current value, while the vehicle is traveling.

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101. The vehicle driving force control apparatus as recited in claim 67, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting a prescribed motor torque of the drive source that corresponds to the drive torque at which an armature current value to become equal to a predetermined end-time armature current value, while the vehicle is traveling.

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102. The vehicle driving force control apparatus as recited in claim 67, wherein

the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting an armature current value of the drive source that corresponds to a predetermined end-time armature current value, while the vehicle is traveling.

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103. The vehicle driving force control apparatus as recited in claim 67, wherein the transition determining section is further configured to determine the transition condition indicating cease the drive torque of the drive source to the wheel based on detecting that the drive torque of the drive source has substantially reached the target drive torque, while the vehicle is traveling.

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104. A vehicle driving force control apparatus for a vehicle provided with a wheel, a drive source configured to supply the wheel with a drive torque, and a clutch disposed in a torque transfer path from the drive source to the wheel, the vehicle driving force control apparatus comprising:

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transition determining means for outputting a transition determination upon determining a transition condition indicating cease of the drive torque of the drive source to the wheel, while the vehicle is traveling; and

clutch release means for disengaging the clutch, upon the drive torque of the drive source substantially reaching a target drive torque in which a difference between an output torque of the clutch and an input torque of the clutch is smaller than a prescribed value in response to the transition determination by the transition determining means.

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105. A method of controlling a vehicle driving force of a vehicle provided with a wheel, a drive source configured to supply the wheel with a drive torque, and a clutch disposed in a torque transfer path from the drive source to the wheel, the vehicle driving force control apparatus comprising:

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determining a transition condition indicating cease of the drive torque of the drive source to the wheel, while the vehicle is traveling;

outputting a transition determination upon the determining of the issuance of the control command; and

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disengaging the clutch, upon the drive torque of the drive source substantially reaching a target drive torque in which a difference between an output torque of the clutch and an input torque of the clutch is smaller than a prescribed value in response to the transition determination.